ABT 2006 Spring Outage

Material		
Segment Wear Liners		$ 107,100.00
Fuel Injector diffuser/wear liner		$ 92,000.00
Ceramic Bricks		$ 7,050.00
Tips, 309SS 42" from PI		$ 4,570.00
Throat Segments		
# bags Super Abrade		$ 798.00
F3 burner 06-48595		
	Sub Total	$ 211,518.00
Total Material		
Labor		
PO Release 320		$ 256,834.00
PO Release 319		$ 21,000.00
F3		$ 6,183.00
	Sub Total	$ 284,017.00
	Total	$ 495,535.00

2008

ABT	Unit Price	Quantity	Total
Fuel Injectors price each	$ 36,300.00	48	$ 1,742,400.00
	shipping	10%	$ 174,240.00
15% discount if ordered by June 15, 2006	taxes		$ 12,196.80
	misc		$ 20,000.00
	total materials +	10%	$ 2,143,720.48
Labor			$ 350,000.00
	sub total		$ 2,493,720.48
	3% inflation		$ 2,568,532.09

2008

Power Industrial (PI)

	Unit Price	Quantity	Total
Coal Nozzles	$ 7,250.00	48	$ 348,000.00
Conical Diffuser	$ 1,225.00	48	$ 58,800.00
Coal Deflector	$ 360.00	48	$ 17,280.00
Seal Plate	$ 250.00	48	$ 12,000.00
	misc		$ 20,000.00
		sub total	$ 456,080.00
	material change	+20%	$ 547,296.00
	shipping	10%	$ 54,729.60
	taxes		$ 3,831.07
	Total materials		$ 605,856.67
Labor	Total labor		$ 350,000.00

	Total		$ 955,856.67

Tip Only Option

	Unit Price	Quantity	Total
Coal Tip	$ 4,110.00	48	$ 197,280.00
	material change	20%	$ 236,736.00
	misc		$ 20,000.00
	shipping		$ 19,728.00
	taxes		$ 1,380.96
	Total materials		$ 277,844.96
	Total Labor		$ 350,000.00
	Total		$ 627,844.96

INTERMOUNTAIN POWER SERVICE CORPORATION

☐ REQUISITION FOR CAPITAL EQUIPMENT

☒ PURCHASE AUTHORIZATION FOR EXPENSE ITEMS

Purpose of Materials, Supplies or Services:

Purchase air flow divider cylinder for burner repair on Unit 2 burners Spring 2008 planned outage

Date: 28-Jan-08
Req./PA No: ????
P.O. No:
Vendor:
Terms:
FOB:
Ship Via:
Conf. To:

Suggested Vendor: Power & Industrial
95 Washington Street
PO Box 211 Donora, PA 15033

Account No. 00-2SGX-402
Work Order No. 06-03474
Project No. IGS07-02

Qty	Unit	Description Noun / Adjective / Catalog # / Seller or Manufacturer	Unit Cost	Extension
24	ea	Air Flow Divider Cylinder, 33-3/4" OD x 33" ID	$2,385.00	$57,240.00
		x 28" long, with one beveled end, fabricated from		
		253MA.		
		TOTAL ESTIMATED COST		$57,240.00

Remarks: See attached quote.

Delivery requested by [Date] 03-28-08 Originator Garry Christensen

Dept. Mgr/Supt. Date | Station Manager Date | Operating Agent Date

IP7021248

INTERMOUNTAIN POWER SERVICE CORPORATION

Date: 12-Sep-07
Req./PA No: 234385
P.O. No:
Vendor:
Terms:
FOB:
Ship Via:
Conf. To:

☐ REQUISITION FOR CAPITAL EQUIPMENT

☒ PURCHASE AUTHORIZATION FOR EXPENSE ITEMS

Purpose of Materials, Supplies or Services:

Perform a failure analysis and determine the failure mechanism on a ABT Burner Tip

Suggested Vendor: Thielsch Engineering
195 Frances Ave.
Cranston, RI 02910

Account No. 00-2SGX-402
Work Order No. 06-03474
Project No. IGS07-02

Qty	Unit	Description Noun / Adjective / Catalog # / Seller or Manufacturer	Unit Cost	Extension
1	ea	Failure Analysis on ABT burner tip	$15,000.00	$15,000.00
		TOTAL ESTIMATED COST		$15,000.00

Remarks:

Delivery requested by [Date] 09-30-07 Originator Garry Christensen

Dept. Mgr/Supt. Date | Station Manager Date | Operating Agent Date

IP7021249

INTERMOUNTAIN POWER SERVICE CORPORATION

☒ REQUISITION FOR CAPITAL EQUIPMENT

☐ PURCHASE AUTHORIZATION FOR EXPENSE ITEMS

Date: 27-Nov-07
Req./PA No: 234410
P.O. No:
Vendor:
Terms:
FOB:
Ship Via:
Conf. To:

Purpose of Materials, Supplies or Services:

Removal of existing Unit 2 burner elbows and burner injectors and installation of new injectors and elbows supplied by Siemens during Spring 2008 planned outage.

Suggested Vendor: AP&F
1230 West 2600 South
Woods Cross, UT 84087

Account No. 00-2SGX-402
Work Order No. 06-03474
Project No. IGS07-02

Qty	Unit	Description Noun Adjective	Catalog #	Seller or Manufacturer	Unit Cost	Extension
48	ea	Replace existing burner elbow and burner injector			$5,208.33	$250,000.00
		with new injector and elbow supplied by Siemens.				
		Same conditions as under site services contract				
		with AP&F #45603.				
		TOTAL ESTIMATED COST				$250,000.00

Remarks: Installation of the new burner injectors and burner elbows on Unit 2 supplied by Siemens per October 31, 2007 meeting.
AP&F phone 801-397-2763, Fax 801-397-1899, email www.apfpower.com

Delivery requested by [Date] 03-01-08 Originator Garry Christensen

Dept. Mgr/Supt. Date | Station Manager Date | Operating Agent Date

IP7021250

CAPITAL PROJECT JUSTIFICATION 2007-2008

JOB.NO: IGS07-B W.O. # 06-03474-0

TITLE: Unit 2 burner injector / burner replacement

DESCRIPTION: Repair or replace all 48 ABT burner nozzles during the 2008, Unit 2 outage.

JUSTIFICATION: OBSOLESCENCE

WHAT IS OBSOLETE:	ABT burner injector
WHY OBSOLETE:	Damaged during operation
WHEN OBSOLETE:	Needed for 2008 Planned Outage
WHY IS IT STILL NEEDED:	ABT burner deficiencies

ADDITIONAL DETAIL: Severe damage found during 2006 planned outage. Repaired/patched as best as possible with time allowed.

COST ESTIMATE:

	07-08
Engineering Labor	$ 2,000
Installation Labor	$ 360,500
Contractor Labor	$ 0
Material	$2,214,500
Job Total	$2,577,000

ALTERNATIVES: none

EFFECT OF DEFERRAL: Damaged burners may result in loss of generation and possibly an extended forced outage.. Existing ABT burners only made it two years due to an apparent design problem with the original purchased burners.

IGS07-B

IP7021251

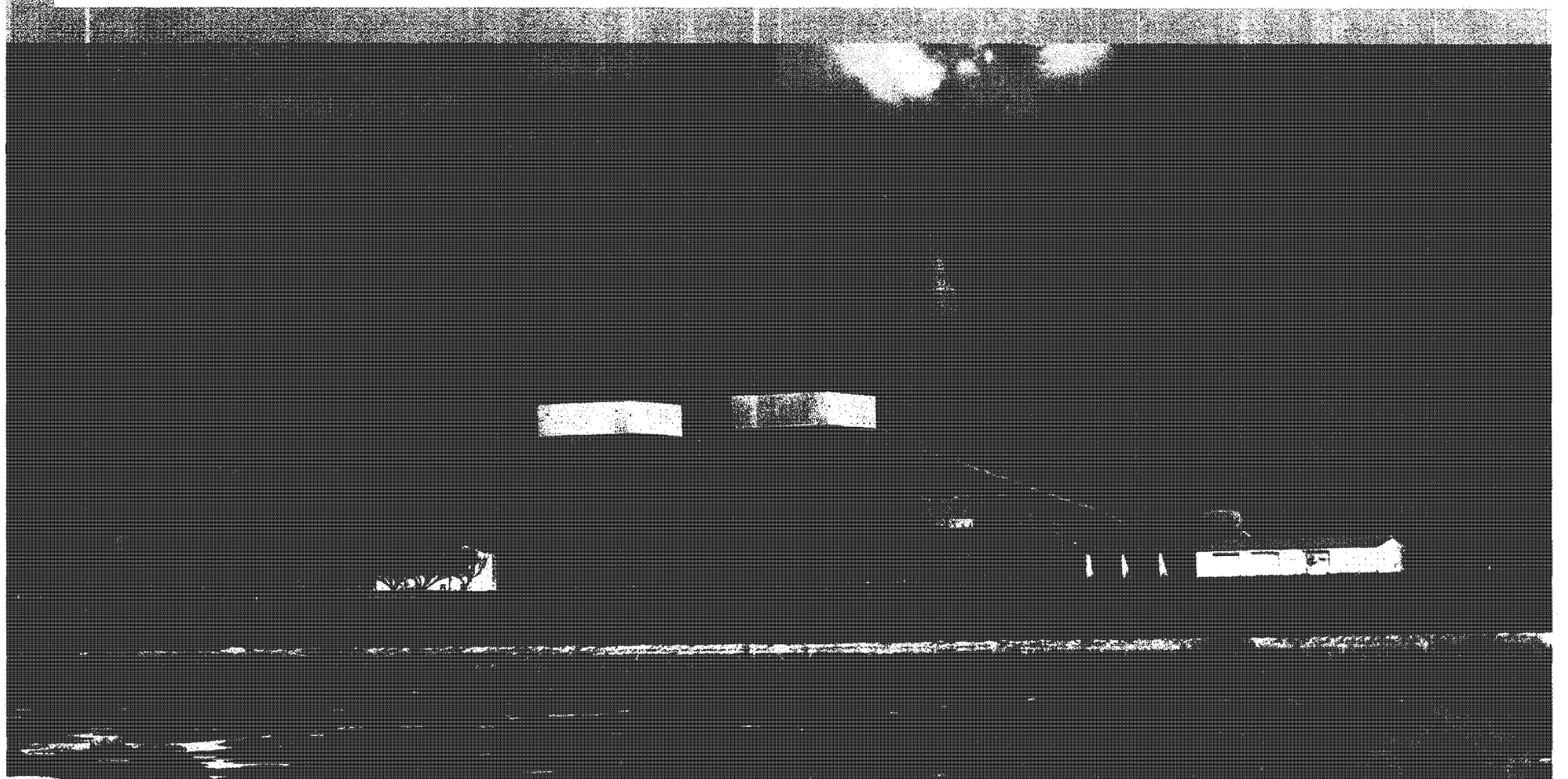
CAPITAL PROJECT JUSTIFICATION 2007-2008

PROJECT HISTORY: ABT burners were purchased and installed Spring 2004 on Unit 2. Damage to burners were found during an inspection on F row following a burner line fire October 2005. Burners continued to show increased erosion problems. Coal tip segment wear liners and a diffuser/wear liner for the injector were purchased and installed during the 2006 planned outage due to time and money constraints.. Severe cracking of the injector tip was also found on many burners during the planned outage. 15 of the worst tips were removed and replaced with another design.

Intermountain Power Service Corp.

ABT Siemens Warranty Claim

SIEMENS



Date: October 17, 2007

IP7021253

Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS

ABT was awarded a contract in 2003 for the material supply of low NOx burners replacing existing B&W burners that had operated since 1992.

The base contract was for material supply only of 48 low NOx burners, 48 ABB Scanners plus air flow measuring equipment.

Approximately one year after commercial operation, the unit suffered a fire in one burner that destroyed the fuel injector. During the following Spring outage, inspection revealed additional nozzles had cracks and excessive thinning of the fuel piping and nozzles.

April 2007, Siemens BTS and IPSC initiated a Six Sigma investigation to determine the root cause of the of the problems with the burners.

Siemens BTS and IPSC agreed on an issue statement with the five items:

1.) The alloy nozzle tip is cracking
2.) There is material loss at the following locations:
    - The burner nozzle tip
    - The "X" vane at the coal pipe elbow
    - The burner barrel
3.) The burner barrel is experiencing permanent deformation
4.) Establish the correct primary airflow for normal operation
5.) Definition of requirements for cooling air when the burner is out of service

Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS

The Six Sigma Root Cause analysis followed the five steps for a Six Sigma Project

Define: clear definition of the problem and the aim of the project

During the define stage, all available correspondence was collected, contract documents were collected, the involved parties were interviewed and an Issue Statement developed and agreed to.

Measure: Examination of the current process and collection relevant data for future analysis

The ABT design records were reviewed, the existing pulverizer performance at IPSC was documented and metallurgical analysis of the cracked burner nozzle was performed.

Analyze: Evaluation of the measured results and identification of the actual cause of the problem

CFD analysis and thermal modeling of the nozzles using the operating parameters as measured during the pulverizer testing was performed. A root cause analysis was generated.

Improve: Selection and implementation of the solution

A new burner design was generated using the information collected during the Define and Measure stage and CFD analysis undertaken to verify changes will

Control: Control of the changed process

The differences between the original design and the revised design need to be implemented and documented

Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS

Executive Summary

The alloy nozzle tip cracking is the result of erosion of the wall thickness in the nozzle due to higher than original air and coal flow. The thinner wall section weakened the nozzle to the point that the nozzle could not accommodate the stress generated by the differential expansion between the stainless steel nozzle and the carbon steel barrel.

There is material loss at the burner nozzle tip, "X" vane at the coal pipe elbow and the burner barrel are a result of coal and air flows being higher than design plus stratification of the coal particles in the coal pipe entering the 90° elbow.

The burner barrel is experiencing permanent deformation due to higher than expected temperatures at the interface between the nozzle and barrel. The burner barrel will use a SS spool piece to extend back into the burner barrel.

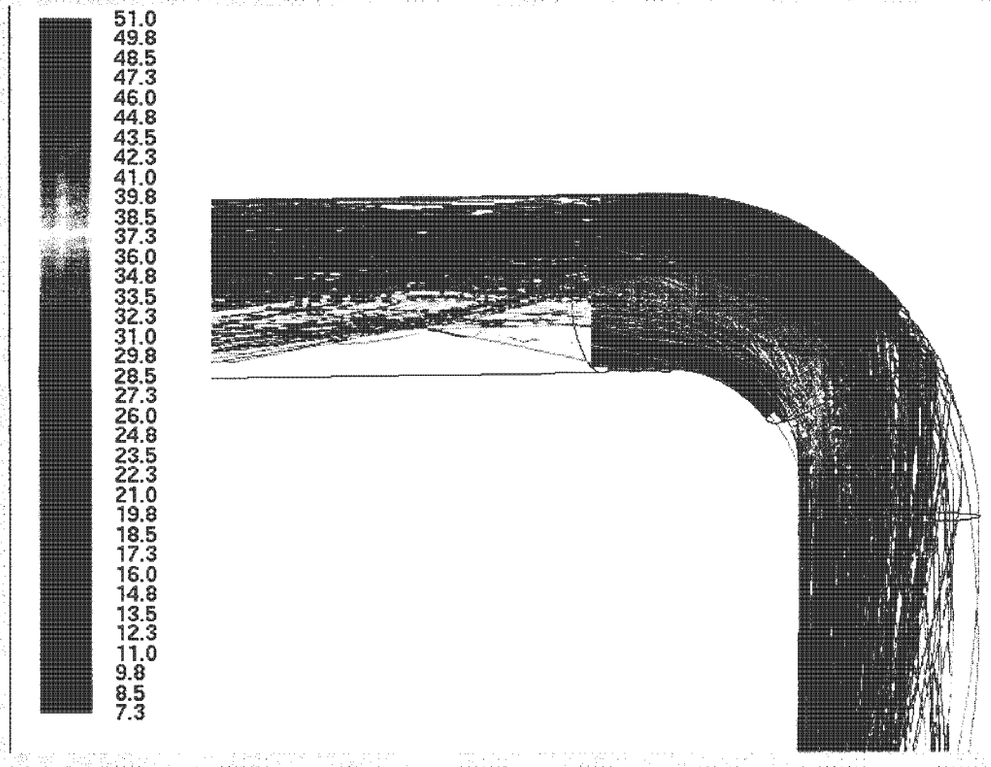
Establish the correct primary airflow for normal operation – The plant has not been operating per the B&W performance curve supplied in the contract. The mill curve supplied in the contract did not reflect the revision by B&W in 1992. Also, the plant has been operating at higher seal air flows

Definition of requirements for cooling air when the burner is out of service – the Operations and Maintenance manual will have to be revised to address out of service operation

Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS

Erosion and Mill Air Flow



The CFD model shows the coal particles are stratified entering the elbow. The original kicker assembly with the X-vane that was modified to retain the clean out port will not last in the high velocity stream of concentrated coal particles with the higher coal flow.

The revised fuel injector design will increase the cross sectional area of the nozzle to reduce velocities, lengthen and flatten the slope of the transition ramp and replace the round elbow with a "Flat back" design to allow dispersion of the coal particles across the flow area of the nozzle.

Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS

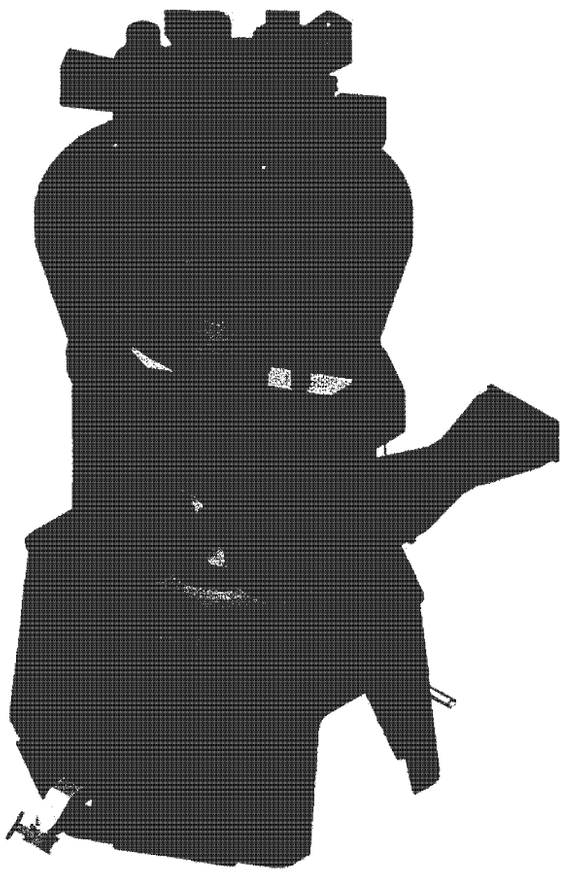
Erosion and Mill Air Flow

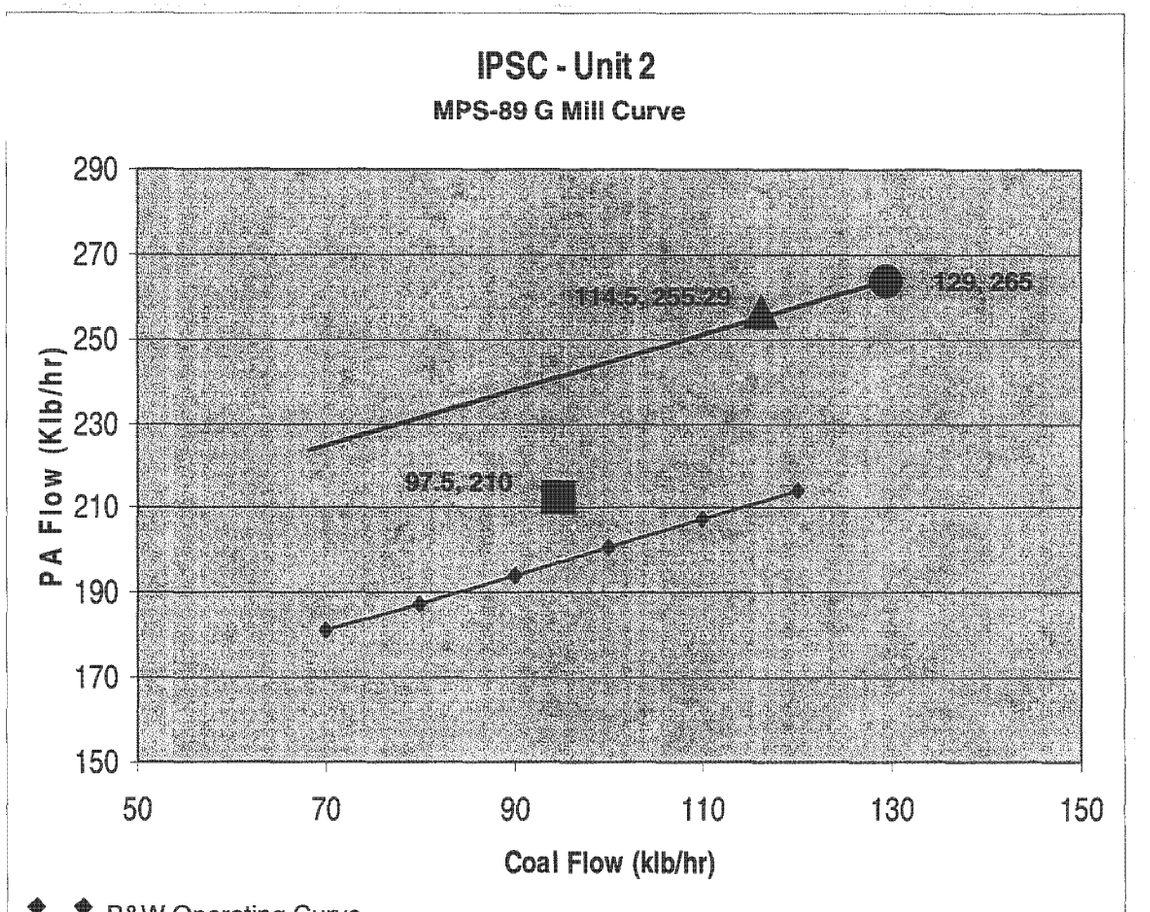
Erosion is originating at the transition slope from the round barrel to the 6 lobe exit. This is consistent with the results of the CFD model. The metallurgical analysis performed by Tordonato Energy Consultants identified erosion as a the contributor cause of the nozzle cracking. The high temperatures at the weld between the nozzle and burner barrel increased the stress which also contributed to the cracking. There was no evidence of corrosion.

Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS

Erosion and Mill Air Flow

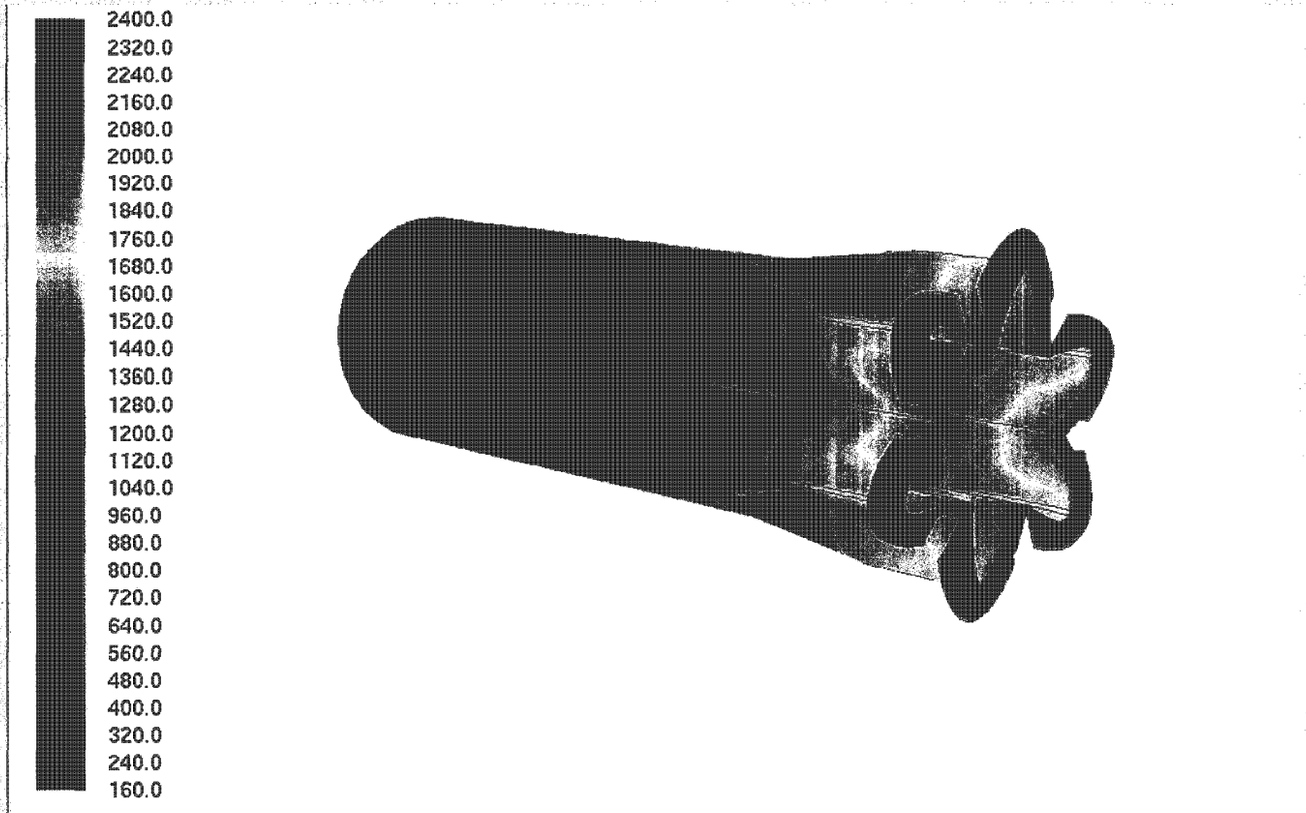




Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS

Thermal Stress



Contours of Static Temperature (f)

Sep 26, 2007
FLUENT 6.3 (3d, pbns, pdf20, rke)

The furnace radiation model shows that the heat conducted back to the burner barrel to be higher than expected. The revised fuel injector will use a spool piece of 253MA stainless steel to make the transition from the nozzle to the barrel. The revised fuel injector shall use refractory tile to shield the burner barrel from radiation from the furnace and to minimize erosion. This thermal model does not model the cooling of the secondary air on the tip.

Intermountain Power Service Corp
ABT Siemens Warranty Claim

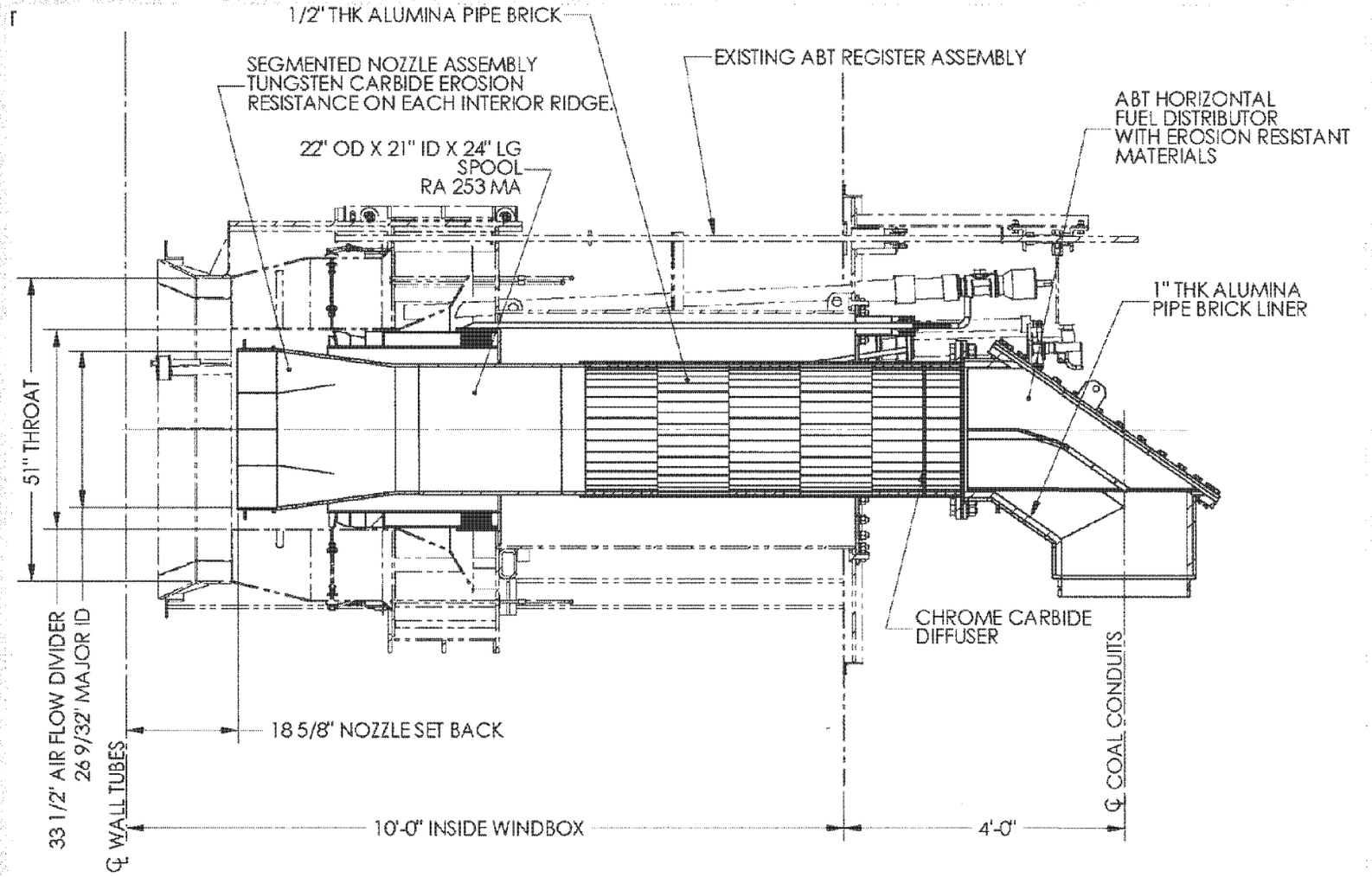
SIEMENS

Thermal Stress

The off line burners are plugging with slag indicating that furnace gases are back flowing into the nozzle area. This creates very high temperatures that the nozzles were not designed for. A minimum air flow required to prevent this must maintained.

Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS



Next Steps

Close Out Six Sigma Program

- Commercial agreement between IPSC and Siemens Power Generation Inc
- Agreement on Division of Responsibilities

INTERMOUNTAIN POWER SERVICE CORPORATION

☒ REQUISITION FOR CAPITAL EQUIPMENT

☐ PURCHASE AUTHORIZATION FOR EXPENSE ITEMS

Date: 27-Nov-07
Req./PA No: 234399
P.O. No:
Vendor:
Terms:
FOB:
Ship Via:
Conf. To:

Purpose of Materials, Supplies or Services:

Purchase of fuel injectors, x-vanes, and flat back elbows for Unit 2 burner outage repairs Spring 2008.

Suggested Vendor: Siemens Power Generation
440 Alafaya Trail MC Q1-101
Orlando, FL 32826

Account No. 00-2SGX-402
Work Order No. 06-03474
Project No. IGS07-02

Qty	Unit	Description Noun Adjective	Catalog #	Seller or Manufacturer	Unit Cost	Extension
48	ea	Fuel Injectors			$12,864.58	$617,500.00
48	ea	x-vane			$1,354.17	$65,000.00
48	ea	flat back elbows			$4,062.50	$195,000.00
		TOTAL ESTIMATED COST				$877,500.00

Remarks: Repairs and material cost agreement from October 31, 2007 meeting with Siemens (Tom Cochran, Bob Allen, John Gallagher) and IPSC (George Cross, Dennis Killian, Jerry Hintze, Garry Christensen) at IPSC.

Delivery requested by [Date] 03-28-08 Originator Garry Christensen

Dept. Mgr/Supt. Date | Station Manager Date | Operating Agent Date

IP7021264

Issues with burner tips at Intermountain 10/15/07

It should be noted that destruction of the burners occurred in less than two years since initial installation of the burners.

We feel that several failure mechanisms are occurring and not just one. We feel that they are:

1. Overheating of the tip in an out-of-service condition causing cracking in the tip due to tip design constraints. In the contract it was stated that "*There are no environmental limitations to the coal burners. The reason for stating that there are no environmental limitations to the coal burners is that the stainless steel castings and plate facing the fire, ASTM 297 Gr He or 309 will not deteriorate at temperatures of at least 2,000 F. Consequently, ABT does not consider operation of its design in your boiler to have any environmental limitations. The conditions are such that no material will operate anywhere near its limit. In fact, ABT has placed no such limitation on any retrofit ABT has done.*
   Thermocouples were initially installed to monitor the tip and barrel temperatures. Out of service temperatures show that many burner tip temperatures did not even reach the 1600 F limit of the indications even though these burners experienced the same destruction. Cracking near the end of the tip do not appear to be connected to the cracking at the erosion areas.

2. Overheat and permanent deformation of the burner barrel causing excessive stress on the weld between the carbon steel barrel and tip casting. Barrel temperatures during an out-of service condition ranged from 700 to 1000 F. Typically each of the six burners on a row had different upper temperatures.

3. Material loss at the flower tip. The contractual proposal stated that "*The segmented coal nozzle has an open design with no obstructions to wear or to collect coal and all wear is limited to the wear-resistant devices in the elbow.*" In less than two years, significant material loss at the flower tip ridges occurred. Cracking from these thinned areas has also occurred. Ductile materials can be very sensitive to abrasion-causing particles depending on the angle of impact. The angle of the tip ridges is around 18 degrees which is high on the erosion vs impact chart.

MEMORANDUM

INTERMOUNTAIN POWER SERVICE CORPORATION

TO: George W. Cross

FROM: Dennis K. Killian

DATE: September 13, 2007

SUBJECT: Manual Requisition Approval for Failure Analysis on Burner Tip

Please approve the attached manual requisition for a failure analysis to be performed by Thielsch Engineering on an Advanced Burner Technology (ABT) burner tip.

In the August 1, 2007 meeting at IPSC, Robert Allen from Siemens stated that from their analysis, the primary failure mechanism was erosion/thinning and then cracking propagated from the thinned areas. Technical Services personnel have also seen cracking not attached to any erosion areas and feel that an independent failure analysis on a failed ABT tip would be beneficial. This evaluation is not for contention purposes but to help verify and cover any other failure mechanisms so the new design will be successful.

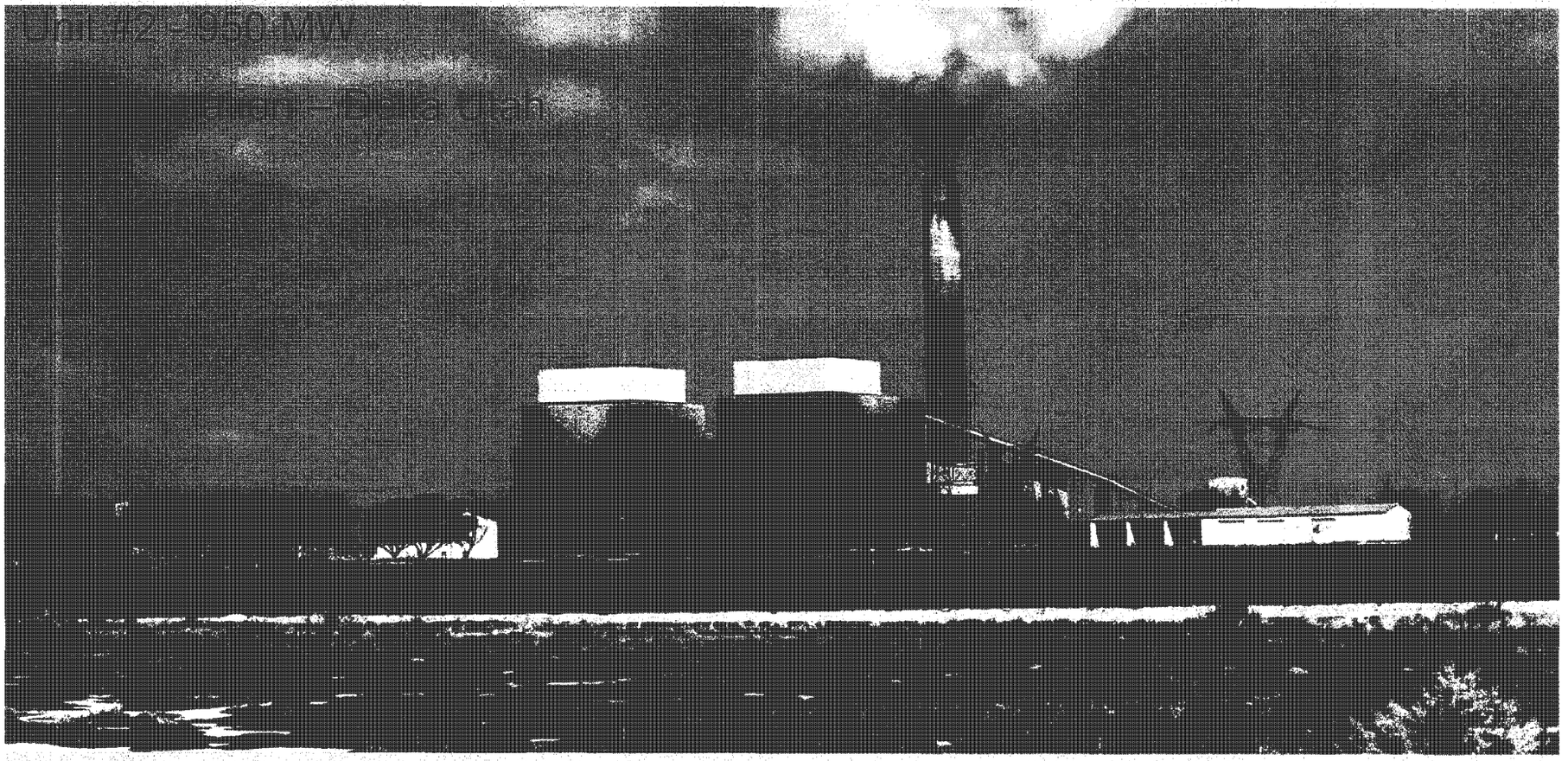
The analysis work will be charged to work order 06-03474 Capital Project IGS07-2.

Any questions regarding this request may be directed to Garry Christensen at extension 6486.

GC/DEW:jmj
Attachment

Intermountain Power Service Corp.
ABT Siemens Warranty Claim

SIEMENS



Date: October 17, 2007

IP7021267

Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS

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The base contract was for material supply only of 48 low NOx burners, 48 ABB Scanners plus air flow measuring equipment.

Approximately one year after commercial operation, the unit suffered a fire in one burner that destroyed the fuel injector. During the following Spring outage, Inspection revealed additional nozzles had cracks and excessive thinning of the fuel piping and nozzles.

April 2007, Siemens BTS and IPSC initiated a Six Sigma investigation to determine the root cause of the of the problems with the burners.

Siemens BTS and IPSC agreed on an issue statement with the five items:

1.) The alloy nozzle tip is cracking
2.) There is material loss at the following locations:
    - The burner nozzle tip
    - The "X" vane at the coal pipe elbow
    - The burner barrel
3.) The burner barrel is experiencing permanent deformation
4.) Establish the correct primary airflow for normal operation
5.) Definition of requirements for cooling air when the burner is out of service

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A new burner design was generated using the information collected during the Define and Measure stage and CFD analysis undertaken to verify changes will

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The differences between the original design and the revised design need to be implemented and documented

Executive Summary

The alloy nozzle tip cracking is the result of erosion of the wall thickness in the nozzle due to higher than original air and coal flow. The thinner wall section weakened the nozzle to the point that the nozzle could not accommodate the stress generated by the differential expansion between the stainless steel nozzle and the carbon steel barrel.

There is material loss at the burner nozzle tip, "X" vane at the coal pipe elbow and the burner barrel are a result of coal and air flows being higher than design plus stratification of the coal particles in the coal pipe entering the 90° elbow.

The burner barrel is experiencing permanent deformation due to higher than expected temperatures at the interface between the nozzle and barrel. The burner barrel will use a SS spool piece to extend back into the burner barrel.

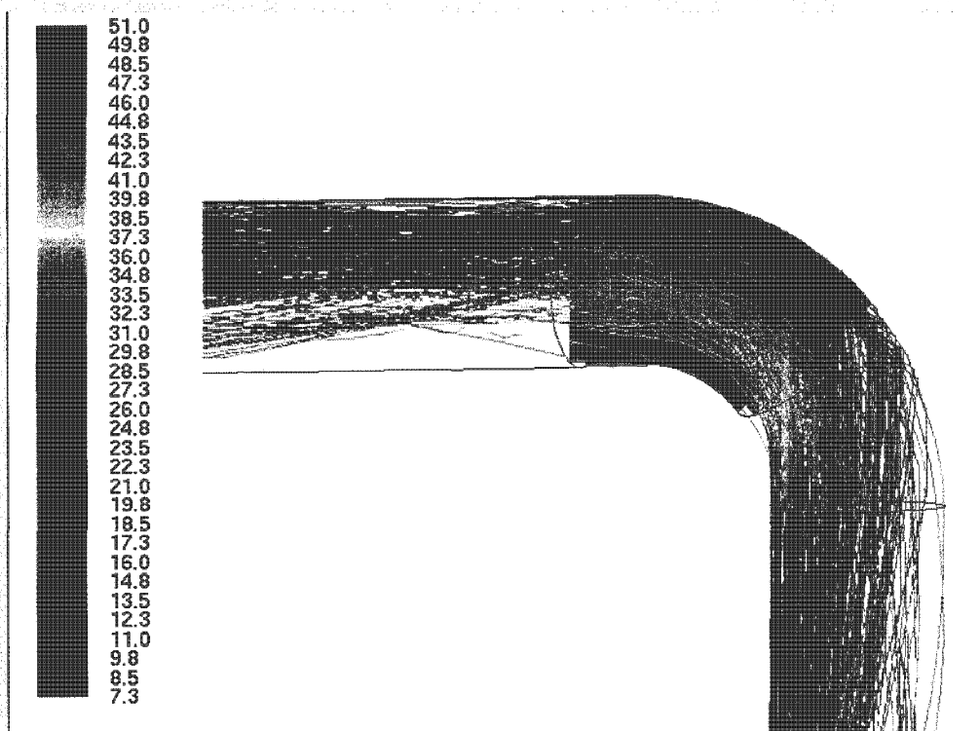
Establish the correct primary airflow for normal operation – The plant has not been operating per the B&W mill performance curve supplied in the contract. The mill curve supplied in the contract did not reflect the revision by B&W in 1992. Also, the plant has been operating at higher seal air flows

Definition of requirements for cooling air when the burner is out of service – the Operations and Maintenance manual will have to be revised to address out of service operation

Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS

Erosion and Mill Air Flow



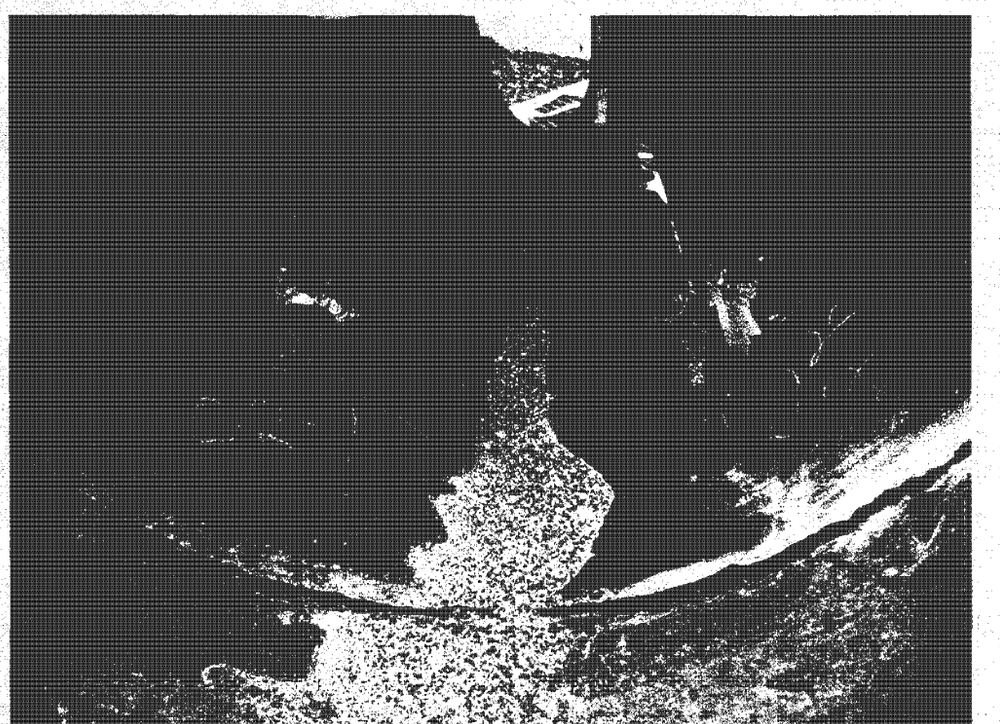
The CFD model shows the coal particles are stratified entering the elbow. The original kicker assembly with the X-vane that was modified to retain the clean out port will not last in the high velocity stream of concentrated coal particles with the higher coal flow.

The revised fuel injector design will increase the cross sectional area of the nozzle to reduce velocities, lengthen and flatten the slope of the transition ramp and replace the round elbow with a "Flat back" design to allow dispersion of the coal particles across the flow area of the nozzle.

Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS

Erosion and Mill Air Flow

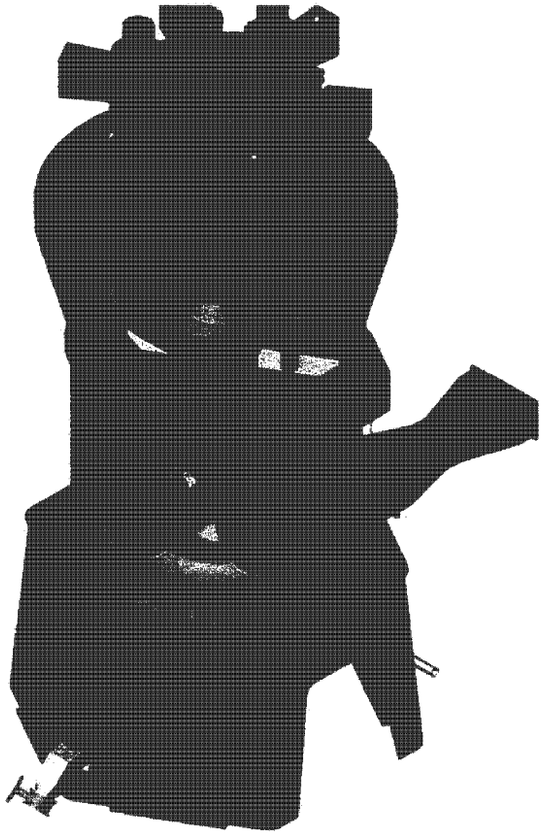


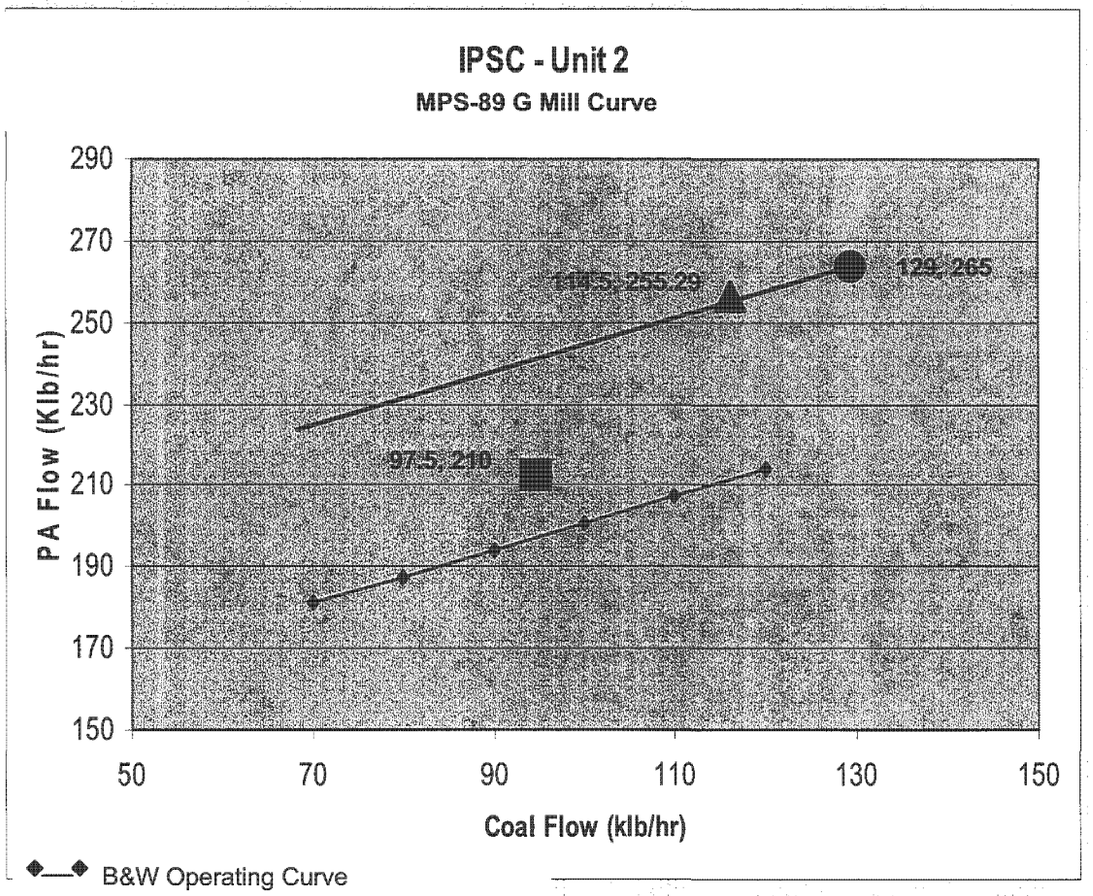
Erosion is originating at the transition slope from the round barrel to the 6 lobe exit. This is consistent with the results of the CFD model. The metallurgical analysis performed by Tordonato Energy Consultants identified erosion as a the contributor cause of the nozzle cracking. The high temperatures at the weld between the nozzle and burner barrel increased the stress which also contributed to the cracking. There was no evidence of corrosion.

Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS

Erosion and Mill Air Flow

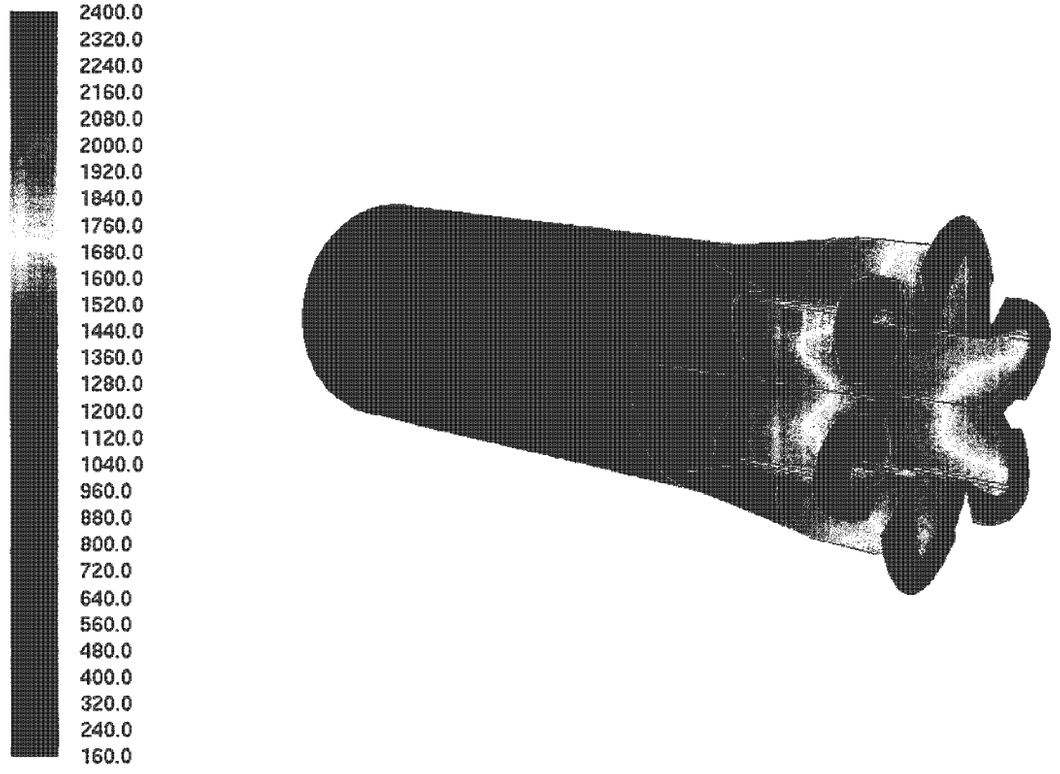




Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS

Thermal Stress



Contours of Static Temperature (f)

Sep 26, 2007
FLUENT 6.3 (3d, pbns, pdf20, rke)

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Intermountain Power Service Corp
ABT Siemens Warranty Claim

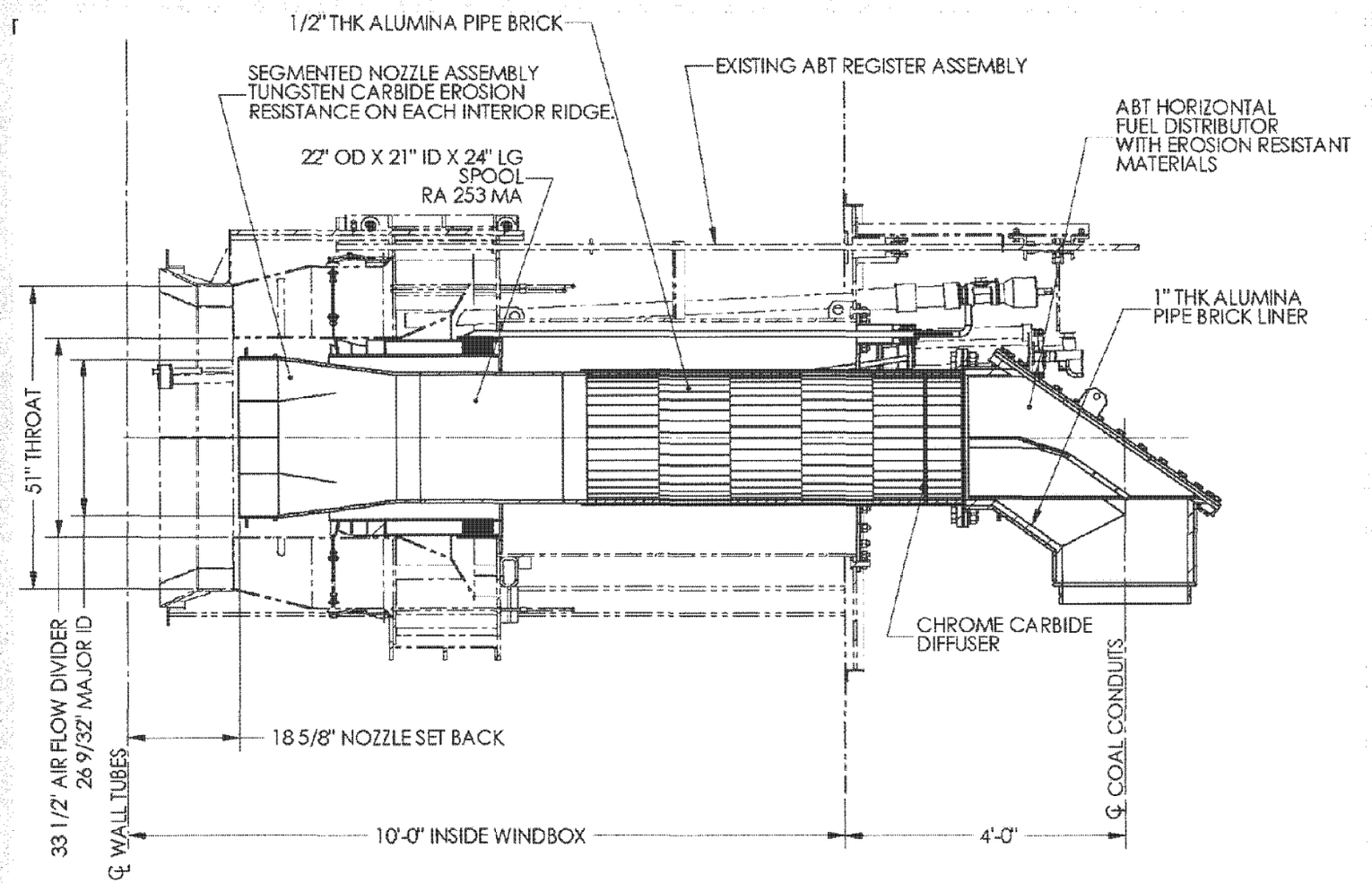
SIEMENS

Thermal Stress

The off line burners are plugging with slag indicating that furnace gases are back flowing into the nozzle area. This creates very high temperatures that the nozzles were not designed for. A minimum air flow required to prevent this must maintained.

Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS



SIEMENS

Next Steps

Close Out Six Sigma Program

- Commercial agreement between IPSC and Siemens Power Generation Inc
- Agreement on Division of Responsibilities

Unit 2 Alternate Burner Plan if Siemens doesn't come through October 2, 2007

Money to replace the burner injectors if needed is on the budget. Total replacement of the burners has not been pursued. One option that has been checked into is to replace the flowered ABT tips with straight tips from Power Industrial and make other repairs as needed. The lead time for the parts are 10-12 weeks. Power Industrial supplied Unit 1's nozzles and tips that have lasted over eight years. We have had very good success with their nozzle tip material. A 40" tip out of PI 2000 would be welded in to replace the flowered ABT tip as well as tips replaced last outage. This process was done on 15 burners in Spring 2006 but with nozzle tips removed from old nozzles and older B&W replacement nozzles. The coal nozzles could be modified to accommodate a conical diffuser and coal deflector similar to Unit 1 burner design. NOx would probably increase but we have OFA available on Unit 2.

Intermountain Generating Station
Unit 2 Burner Injector and Burner Elbow Replacement

Project Description
Replacement of all 48 burner elbows and burner injectors.

The existing burner injectors and burner elbows will be replaced with new injectors and sweep elbows provided by Siemens. The replaced injectors and elbows will be removed from the unit to a designated area. Burners are located on the 5th through the 8th level on the unit.

Scope of Work.:

1. Removal of old burner elbow on all 48 burners. (Just like 2006 outage)
   a. Removal of welded TC from burner pipe.
   b. Install needed rigging for burner pipe support.
   c. Burner elbow removal by row.
   d. Removal of old elbows to designated area outside of unit.
   e. Clean flange mating surface.

2. Removal of old burner injector on all 48 burners. (Just like 2006 outage, 2000 # each)
   a. Removal of lagging and insulation needed to unbolt injector.
      i. Can happen at earlier sequence.
   b. Unbolt injector and pull out of burner. Clean ash before pulling injector out.
   c. Removal of old injectors to designated area outside of unit.

3. Clean up burner casing prior to installation of new injector.
   a. Guzzle up all ash in burner casing and all ash that has fallen into burner secondary air opening.
   b. Repair burner casings as needed. ** Inspection 2 years ago showed damage on several burner casings per row. We will not know the extent of repairs needed until injector pulled.

4. Installation of 48 new burner injectors.
   a. Unload upon arrival and mobilize new burner injectors to appropriate burner rows.
   b. Install new burner injectors by sliding into burner casing and bolting up to burner housing with gasket material.
   c. Install insulation and lagging. (Can be installed after elbow installation)

5. Installation of 48 new flat back burner elbows.
   a. Unload upon arrival and mobilize new burner flat back elbows to appropriate burner rows.
   b. Position and bolt up 48 new burner elbows with gasket material.

6. General cleanup following completion of installation.

7. Painting
   a. After completion of installation (April 21, 2008 at 07:00) IPSC painters to prep elbows and paint. Stencil elbows for identification. i.e. C-1, C-2,....

8. Schedule:
   a. Injectors and flat back elbows:
      i. Start of work: March 28, 2008 or as soon as required materials are on site.
      ii. Completion: Installation and inspections of burner injector and elbows by April 21, 2008 at 07:00

9. Materials:
   a. Materials to be supplied by Siemens.
      i. Burner fuel injector.
      ii. Flat back elbows with x-vane.
   b. Material s supplied by IPSC.
      i. Gasket material for burner elbow flanges.
      ii. Gasket material for injector to burner housing.
      iii. 253 MA material to repair burner casings.
   c. The contractor shall be responsible for providing weld rod, all additional parts, tools, and/or materials including insulation and lagging required for the completion of this job.